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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/487,586	01/19/2000	Lingappa K. Mestha	104419	3331

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EXAMINER	
VIDA, MELANIE M	

ART UNIT	PAPER NUMBER
2626	7

DATE MAILED: 03/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)
	09/487,586	MESTHA ET AL. MN
	Examiner	Art Unit
	Melanie M Vida	2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _03 December 2003_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-28_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-28_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _30 September 2003_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 5.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This action is responsive to an amendment filed 12/3/03. Claims 1-28 are pending.

Response to Arguments

2. Applicant's arguments with respect to claims 1-28 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 2 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 recites the limitation "the image parameters" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. **Claim 1, 5, 8-9, 11, 20** are rejected under 35 U.S.C. 102(b) as being anticipated by Mestha, US Patent No. 5,708,916, (hereinafter, Mestha).

Regarding, **claim 1,** Mestha discloses a xerographic control system, as shown in figure 3, to control electrostatic parameters such as charging, beam power, and developer actuators in response to sensing of DMA on an imaging member, which reads on "a device and illumination independent color reproduction system", (col. 1, lines 5-10; col. 8, lines 40-41). The control loop architecture comprises three different DMA measurements from DMA sensors from the development system (118), which reads on "a color-marking device including a color sensor", (col. 8, lines 41-43). Further, Mestha states that the controller is implemented by feed forward lookup tables to generate nominal developer actuator values to control the response of DMA on an imaging member, which reads on "a color controller including a memory and a controller, the memory including feed-forward look-up table", (col. 10, lines 17-21). The control loop architecture, which reads on "the first processing circuit" converts three different points on the tone reproduction curve to DMA measurement values, which reads on "that converts a reference color spectra", target values in the control system D_h^T, D_m^T, D_m^T, which reads on "into a reference parameter", where the parameters are shown in vector form in equation 6, which reads on "vector", (col. 8, lines 40-45; col. 9, lines 25-34). Mestha illustrates the control loop architecture, which reads on "a second processing circuit" that converts nominally measured vector (x_o), which reads on "that converts a measured color spectra" via a mathematical equation (2), into a vector, (x (k)), which reads on "into a measured parameter vector", (col. 9, lines 1-10).

Regarding, **claim 5,** Mestha discloses in a background embodiment, a densitometer, which reads on "a color sensor" that is disposed along the path of the photoreceptor directly

downstream of the development unit, to measure the light absorption of a test patch, which reads on “is mounted within an output tray of the color marking device”, (col. 3, lines 20-38).

Regarding, **claim 8**, Mestha inherently teaches the apparatus for improving color rendition, comprising, the first processing circuit, a color controller, a color marking device, a color sensor, and a second processing circuit, as evidenced by the corresponding rejection to the method recited in claim 9.

Regarding, **claim 9,** Mestha discloses a xerographic control system, as shown in figure 3, to control electrostatic parameters such as charging, beam power, and developer actuators in response to sensing of DMA on an imaging member, which reads on “a method for improving color reproduction”, (col. 1, lines 5-10; col. 8, lines 40-41). The control loop architecture converts three different points on the tone reproduction curve, which reads on “receiving a reference reflectance spectra” to DMA measurement values, which reads on “converting the reference reflectance spectra”, target values in the control system D_h^T, D_m^T, D_m^T, which reads on “to a corresponding reference parameter”, where the parameters are shown in vector form in equation 6, which reads on “vector”, (col. 8, lines 40-45; col. 9, lines 25-34). Mestha states that the controller has the potential to reach the DMA target with a couple of prints, which reads on “printing an image based on the converted reference parameter vector”, (col. 10, lines 9-11). Further, Mestha illustrates the control loop architecture, converts nominally measured vector (x_o), which reads on “converting the measured reflectance spectra” via a mathematical equation (2), into a vector, (x (k)), which reads on “to a corresponding measured parameter vector”, (col. 9, lines 1-10). The target DMA parameter vector, (D_h^T, D_m^T, D_l^T) is subtracted from the, which reads on “comparing the reference parameter vector”, measured DMA parameter vector, (D_h,

D_m,D_l), which reads on "the measured parameter vector" to generate an output error vector, y(k), as shown in equation 6, comprising the error parameters (E_h, E_m, E_l), which reads on "to determine an error vector", (see figure 3). The algorithm used in the controller to compute u_g, u_l, and u_d is computed using the Error vector and the nominally measured values, which reads on "processing the error vector and the parameter vector to produce spectrally matched outputs", (col. 9, lines 34-43; col. 10, lines 9-11).

Regarding, **claim 11,** Mestha teaches that the controller is implemented for those pixels, that cause an error, E_h, E_m, and E_l, as shown in figure 3, between the target DMA values, D_h^T, D_m^T, D_m^T and the DMA measured values D_h^T, D_m^T, D_m^T on an image medium are adjusted until they are both matched, which reads on "converting the reference reflectance spectra measuring a reflectance spectra of certain critical pixels of the image", (col. 8, lines 51-53; col. 10, lines 9-17).

Regarding, **claim 20,** please refer to the corresponding rejection in claim 9.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. **Claims 2, 12-16, 21-26, 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mestha, US-PAT-NO: 5,708,916 as applied to claim 1 above, and further in view of Pfeiffer et al. US-PAT-NO: 5,967,033, (hereinafter, Pfeiffer).

Regarding, **claim 2,** Mestha teaches the device and illumination color reproduction system of claim 1, but fails to expressly disclose the image parameter mapping look up table that translates the color image parameters to a device dependent color space.

However, Pfeiffer teaches the chart in figures 1-2, where the infrared value I is mapped to brightness value, L, to determine ink coverage $\mathbf{A_C}$, $\mathbf{A_Y}$, $\mathbf{A_M}$, which reads on "an image parameter mapping look-up table that translates the color image parameters to a device dependent color space", (col. 6, lines 53-57).

At the time the invention was made, it would have been obvious to one of ordinary skill to modify the device and illumination color reproduction system with the image parameter-mapping look up table that will translate the color image parameters to a device dependent color space.

One of ordinary skill in the art would be motivated to have an image parameter-mapping look up table that will translate the color image parameters to a device dependent color space, because, otherwise, there is enormous computation expense required for in-image measurement and thus unreasonably long computation times associated with the practice, given the express suggestion of Pfeiffer, (col. 1, lines 49-52).

Regarding, **claim 12,** Mestha teaches the method of claim 9, but fails to expressly disclose that the reference reflectance spectrum includes the reference reflectance spectra through a linear transformation.

However, Pfeiffer teaches that an infrared, value I, which reads on "the reference reflectance spectra", is transformed through a substantially, constant slope relationship with a

corresponding output brightness value (L) as shown in figure 1, which reads on "includes the reference reflectance spectra through a linear transformation".

At the time the invention was made it would be obvious to one of ordinary skill in the art to modify Mestha's method in claim 9, with a linear transformation, by Pfeiffer.

One of ordinary skill in the art would be motivated to use a linear transformation to transform reference reflectance spectra because the color vectors have a method to calculate by linear interpolation from the color vectors in the sixteen nearest discrete screen value combinations, given the express suggestion of Pfeiffer, (col. 4, lines 42-46).

Regarding, **claim 13,** Mestha teaches the method of claim 9, but fails to expressly disclose that the reference reflectance spectrum includes the reference reflectance spectra through a non-linear transformation.

However, Pfeiffer teaches in the background of the invention, that a conversion relationship between black printing ink and mathematical color values, such as three primary color inks CMY is non-linear, which reads on "includes the reference reflectance spectra through a non-linear transformation".

At the time the invention was made it would be obvious to one of ordinary skill in the art to modify Mestha's method in claim 9, with a non-linear transformation, by Pfeiffer.

One of ordinary skill in the art would be motivated to use a non-linear transformation to transform a reference reflectance spectra because conversion to mathematical color values because there is no linear relationship between black printing ink, and the three primary color image CMY, (col. 2, lines 65-col. 2, lines 2).

Regarding, **claim 14,** Mestha teaches the method of claim 9, but fails to expressly disclose, "converting the reference reflectance spectra includes converting the reference reflectance spectra using predetermined algorithms".

However, Pfeiffer states of having predetermined ink coverage values, calculated using a model from color values, L, a, b, I, ink coverage values, which reads on "converting the reference reflectance spectra includes converting the reference reflectance spectra using predetermined algorithms", (col. 6, lines 57-64).

At the time the invention was made, it would be obvious to one of ordinary skill in the art to modify Mestha with predetermined algorithms for converting the reference reflectance spectra.

One of ordinary skill in the art would have been motivated to use predetermined algorithms in order to permit high-speed determination of ink coverage's at a reasonable cost, given the express suggestion of Pfeiffer, (col. 2, lines 16-21).

Regarding, **claim 15,** Pfeiffer states that the transformation of color values, L, a, b, into ink coverage values is predetermined based on a model, which reads on "converting the reference reflectance spectra using predetermined algorithms includes using only three parameters in the parameter vector per spectra from one of the standard CIE, XYZ, or L*a*b* color spaces", (col. 6, lines 55-57).

Regarding, **claim 16,** Pfeiffer states that the transformation of color values, L, a, b, I (infrared value) into ink coverage values is predetermined based on a model, which reads on "converting the reference reflectance spectra using predetermined algorithms includes using

more than three parameters in the parameter vector per spectra from one of the standard CIE, XYZ, or L*a*b* color spaces", (col. 6, lines 55-57).

Regarding, **claim 21,** please refer to the corresponding rejection of "converting the measured reflectance spectra" in claim 1, and "through a linear transformation" in, claim 12.

Regarding, **claim 22,** please refer to the corresponding rejection of "converting the measured reflectance spectra" in claim 1, and "through a non-linear transformation" in claim 13, above.

Regarding, **claim 23,** please refer to the corresponding rejection of "converting the measured reflectance spectra" in claim 1 and "using predetermined algorithms" as taught in claim 14, above.

Regarding, **claim 24,** please refer to the corresponding rejection of "converting the measured reflectance spectra" in claim 1 and "using predetermined algorithms includes using only three parameters in the parameter vector per spectra from one of the standard CIE, XYZ, L*a*b* color spaces," as taught in claim 15, above.

Regarding, **claim 25,** please refer to the corresponding rejection of "converting the measured reflectance spectra" in claim 1 and "using predetermined algorithms includes using more than three parameters in the parameter vector per spectra from one of the standard CIE, XYZ, L*a*b* color spaces," as taught in claim 16, above.

Regarding, **claim 26,** please refer to the corresponding rejection of "converting the measured reflectance spectra" in claim 1 and "using predetermined algorithms includes computing XYZ tristimulus values," as taught in claim 17, above.

Regarding, **claim 28,** Mestha teaches the method of claim 9, but does not state that the "received reference reflectance spectra is converted into the reference parameter vector using observer functions an illuminant spectra, and a reference reflectance spectra".

However, Pfeiffer teaches a conversion via figure 1, between an infrared value (I), which reads on "received reference reflectance spectra" into brightness value (L), which reads on "converted into the reference parameter vector" using a model of L, a, b, I into predetermined ink coverage values, which reads on "using observer functions an illuminant spectra, and a reference reflectance spectra", (col. 6, lines 55-60).

At the time the invention was made it would be obvious to one of ordinary skill in the art to modify the method taught by Mestha with a predetermined model for acquiring ink coverage values.

One of ordinary skill in the art would be motivated to use a model because there is difficulty from the enormous computation expense and unreasonably long computation times, given the express suggestion of Pfeiffer, (col. 1, lines 49-52).

8. **Claims 3, 6-7,** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mestha, US-PAT-NO: 5,708,916 as applied to claim 1 above, and further in view of Giorgianni et al. US-PAT-NO: 5,452,111, (hereinafter, Giorgianni).

Regarding, **claim 3,** Mestha teaches the device and illumination independent color reproduction system of claim 1, but fails to expressly disclose, "including an image parameter mapping look-up table that translates the color image parameters to a device independent color space".

However, Giorgianni teaches of transforms for A-N types of data scanned from a plurality of input sources such as a reflection scanner, transmission scanner, and other input (i.e. digital camera), that are transformed into relative trichromatic exposures R'G'B', which reads on "including an image parameter mapping look-up table that translates the color image parameters to a device independent color space", (see figure 2).

At the time the invention was made it would have been obvious to one of ordinary skill in the art to modify Mestha's device and illumination independent color reproduction with Giorgianni's transforms to transform data from a plurality of input sources to a relative trichromatic exposures, R'G'B'.

One of ordinary skill in the art would be motivated to have an image parameter mapping table in order to transform data from a plurality of input devices to a device independent color space, as illustrated in figure 2, Giorgianni.

Regarding, **claim 6,** Mestha teaches the color reproduction system of claim 1, but fails to expressly disclose that at least one color image data source connectable to the first processing circuit.

However, Giorgianni teaches that the transmission film scanner, which reads on "at least one color image data source" is connectable to a transform apparatus, which reads on "connectable to the first processing circuit", as shown in figure 9.

At the time the invention was made it would have been obvious to one of ordinary skill in the art to modify the color reproduction system with a film source connected to a processing circuit.

One of ordinary skill in the art would be motivated to connect a data source to a processing circuit, in order to process the incoming data.

Regarding, **claim 7,** Giorgianni also illustrates in figure 10, a digital camera, a transmission scanner, and a reflection scanner, which reads on "at least one color image data source", connectable to a type of transform, which reads on "is one of a locally or remotely located computer, a personal digital assistant, a scanner, a digital camera or a facsimile machine".

9. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Mestha, US-PAT-NO: 5,708,916 as applied to claim 1 above, and further in view of Vincent, US-PAT-NO: 5,671,059, (hereinafter, Vincent).

Regarding, **claim 4,** Mestha teaches the device and illumination independent color reproduction system of claim 1, but fails to expressly disclose, "the color sensor is mounted in an output paper path of the color marking device".

However, Vincent illustrates in figure 4, a colorimeter (10) mounted to the color printer by electrodes (11) and mounted along the exiting paper path in a position where the paper (23) is viewed by the colorimeter (10) after the image has been printed, which reads on "the color sensor is mounted in an output paper path of the color marking device", (col. 4, lines 10-15).

At the time the invention was made it would have been obvious to one of ordinary skill in the art to modify Mestha's system with a color sensor in the output path of the color marking device".

One of ordinary skill in the art would be motivated to use a color sensor in the output of the paper path in a color marking device in order to account for ambient light, given the express suggestion of Vincent, (col. 4, lines 23-25).

10. **Claims 10 and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mestha, US-PAT-NO: 5,708,916 as applied to claim 1 above, and further in view of Lloyd et al. EP-PAT-NO: 625847 A1, as cited by the applicant, (hereinafter, Lloyd).

Regarding, **claim 10,** Mestha teaches the method of claim 9, but fails to expressly disclose, "converting the reference reflectance spectra includes storing the reference reflectance spectra in a look-up-table".

However, Lloyd teaches a color correction look up table that performs first or second-order chi-squared polynomial fits on the data in the calibration source file, which reads on "converting the reference reflectance spectra includes storing the reference reflectance spectra in a look-up-table", (page 7, lines 48-50).

At the time the invention was made it would be obvious to one of ordinary skill in the art would be motivated to modify Mestha's method with a look-up table as taught by Lloyd.

One of ordinary skill in the art would be motivated to have a color correction look-up table in order to approximate a polynomial second-order or first-order chi-squared model, given the express suggestion of Lloyd, (page 7, lines 50-53).

Regarding, **claim 19,** Mestha teaches the method of converting the measured reflectance spectra, as discussed in claim 1 above. Mestha does not state, "includes storing the measured reflectance spectra in a look-up table".

However, Lloyd teaches a color correction look-up table that performs first or second order chi-squared polynomial fits on the data in the calibration source file, which reads on includes storing the measured reflectance spectra in a look-up table.

At the time the invention was made it would be obvious to one of ordinary skill in the art would be motivated to modify Mestha's method with a look-up table as taught by Lloyd.

One of ordinary skill in the art would be motivated to have a color correction look-up table in order to approximate a polynomial second-order or first-order chi-squared model, given the express suggestion of Lloyd, (page 7, lines 50-53).

11. **Claims 17-18, 27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mestha, US-PAT-NO: 5,708,916, and further in view of Pfeiffer et al. US-PAT-NO: 5,967,033, (hereinafter, Pfeiffer), as applied to claim 14 above, and further in view of Arai (as cited by the applicant; hereinafter, Arai).

Regarding, **claim 17,** Mestha in view of Pfeiffer converting the reference reflectance spectra using predetermined algorithms" as discussed in claim 14. However, they do not teach this conversion using standard X, Y, Z, tristimulus values".

However, Arai, teaches that L*a*b* are defined in formulate from XYZ values, which reads on "includes computing standard X, Y, Z, tristimulus values".

At the time the invention was made it would be obvious to one of ordinary skill in the art to convert reference reflectance spectra as taught by Mestha in view of Pfeiffer, above, with XYZ tristimulus values.

One of ordinary skill in the art would be motivated to convert reference reflectance spectra using XYZ tristimulus values, using the well-known equations, shown in Arai, (col. 13, lines 6-31).

Regarding, **claim 18,** Arai further teaches L*a*b* values from XYZ values, which reads on "converting the reference reflectance spectra using predetermined algorithms includes computing L*a*b* color values", (col. 13, lines 6-31).

Regarding, **claim 27,** please refer to the corresponding rejection of "converting the measured reflectance spectra" in claim 1 and "includes computing L*a*b*," as taught in claim 18, above.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Barasch et al. US-PGPUB : 2003/0223098 A1, a predictive model to predict color values for an output device, see paragraph 0006.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie M Vida whose telephone number is (703) 306-4220. The examiner can normally be reached on 8:30 am 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly A Williams can be reached on (703) 305-4863. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Melanie M Vida
Examiner
Art Unit 2626

MMV
mmV

KA Williams

February 23, 2004

KIMBERLY WILLIAMS
SUPERVISORY PATENT EXAMINER